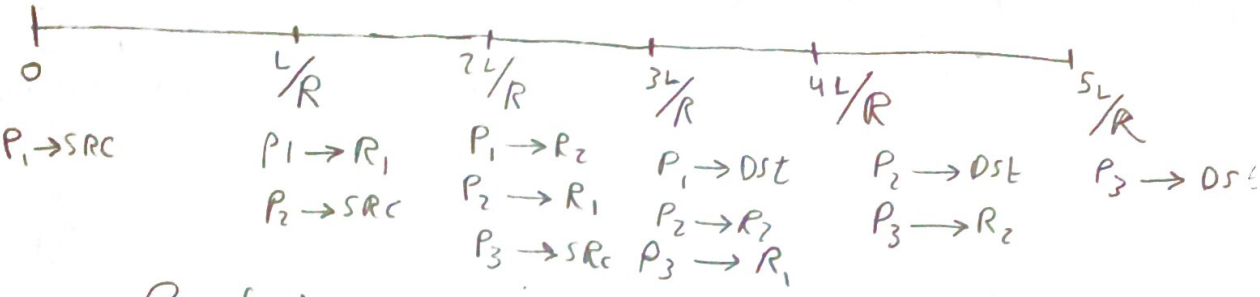
8/10/2016 السبت م. عماد سكشن نظري 1

Sheet 1:-

P2: $d_{end\text{-}to\text{-}end} = N\frac{L}{R}$



Generalize for (P) packets

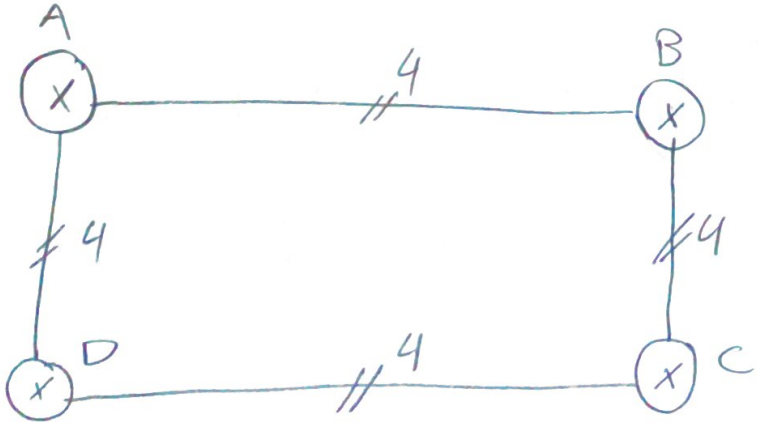
$$d = (N+P-1)\frac{L}{R}$$

zero index

P3: a) Circuit switching, since it requires Long time and sends at fixed rate.

b) No need for congestion control, since the data rate is less than the capacity.

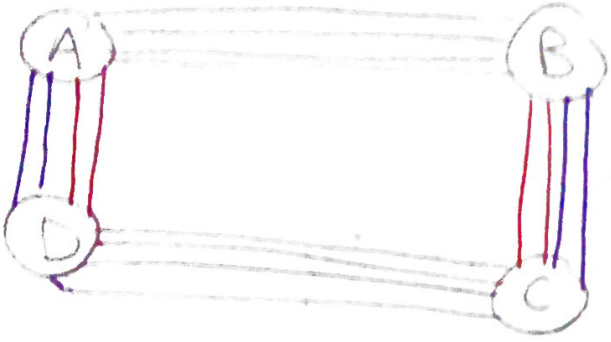
P4:



a) 4*4 = 16 connection

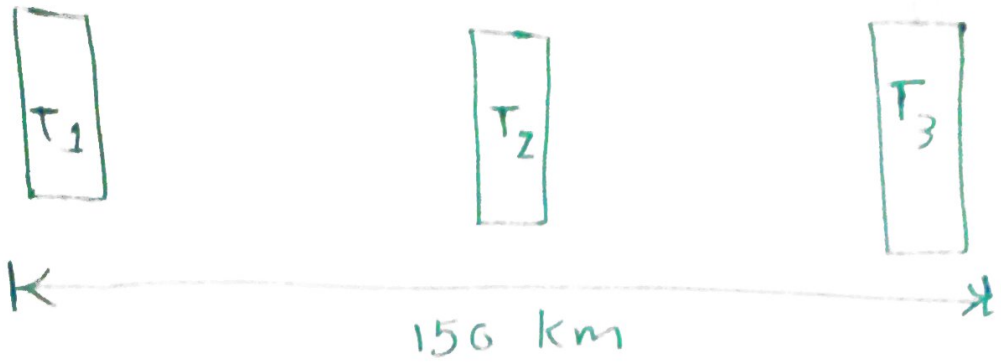
b) 8 → 4 ABC, 4 ADC

c)



2 ABC + 2 ADC
2 BCD + 2 BAD

P5: a)



$d_{end-to-end} = 3d_{Proc} + 2d_{prop}$

$= 3 * 12 * 10 + 2 \times \frac{75000\ m}{100\ 000\ m/hr}$

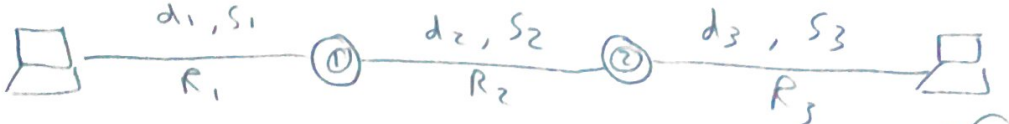
$= 96$ min

b) $d = 3 * 12 * 8 + 2 \times \frac{75000\ m}{100\ 000\ m/hr}$

$= 94.8$ min ✓

P6: [Report] Page 72 in Reference

P10:



$d_{end-to-end} = d_{proc_1} + d_{proc_2} + \underbrace{\frac{L}{R_1} + \frac{L}{R_2} + \frac{L}{R_3}}_{Trans} + \underbrace{\frac{d_1}{S_1} + \frac{d_2}{S_2}}_{prop}$

delays;
proc.
trans.
prop.

Suppose $L = 1500\ B = 1500 * 8$ bits

$S_1 = S_2 = S_3 = 2.8 * 10^8$ m/s

$R1 = R_2 = R_3 = 2$ Mbps

$d_{proc} = 3$ msec

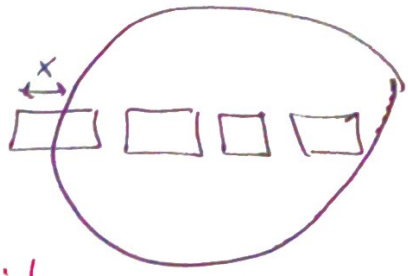
Given d_1, d_2, d_3

Substitute in the previous formula

$d = 64$ ms

P 11: [Report] Page 73 in Reference

P 12: $d_{\text{queue}} = \frac{nL}{R} + \frac{L-x}{R}$



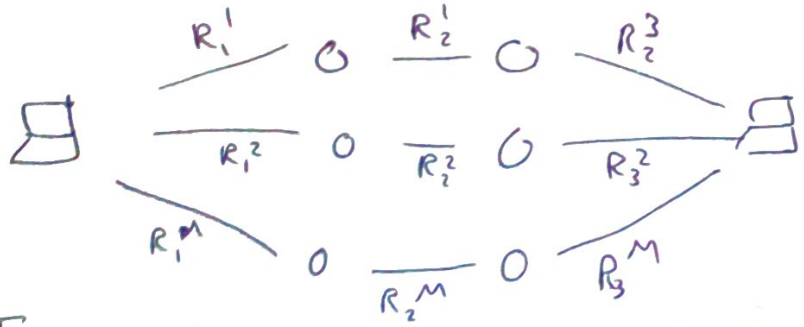
$n = 4$, $L = 1500 * 8$ bit

$R = 2$ Mbps, $x = 750 * 8$ bit

$d = 27$ ms

P 20: Throughput $= \min\{R_s, R_c, R/n\}$

P 21:



① Max Throughput $= \max\{\min(R_1^1, R_2^1, \ldots R_N^1\}, \min(R_1^2 R_2^2, \ldots R_N^2\}, \ldots, \min\{R_1^M, R_2^M, \ldots R_N^M\}\}$

② $\sum_{K=1}^{M} \min\{R_1^K, R_2^K, \ldots R_N^K\}$

Next Section :

Quiz (theoritical)

P6, P11, P23, P24 ⇒ Report